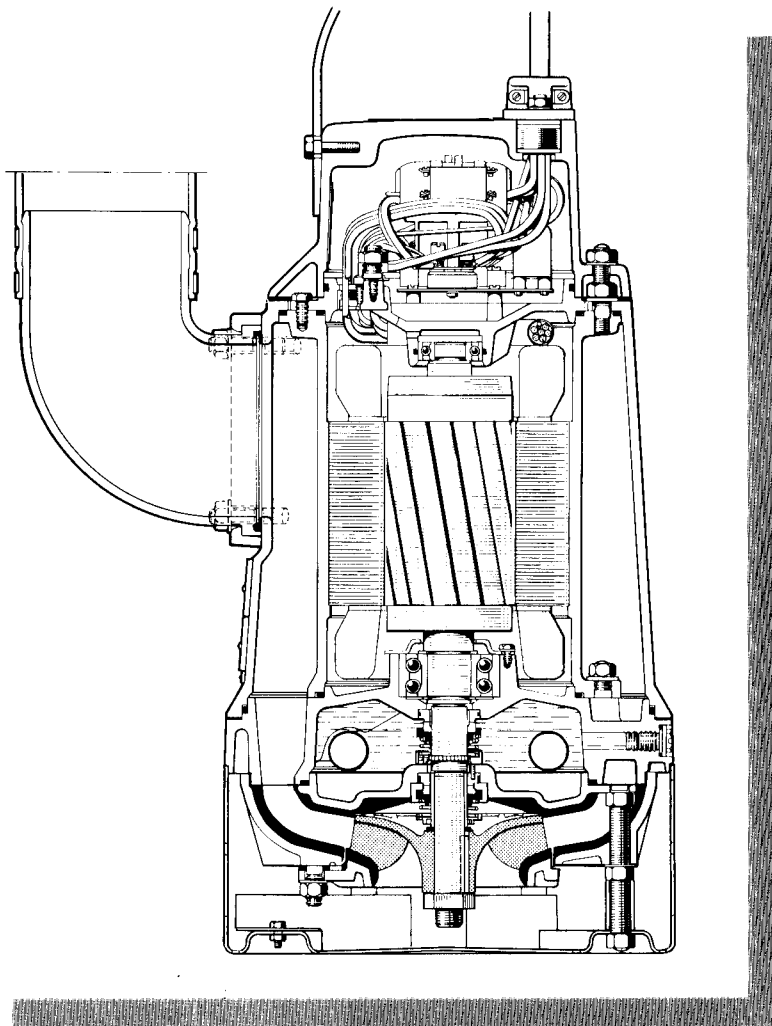
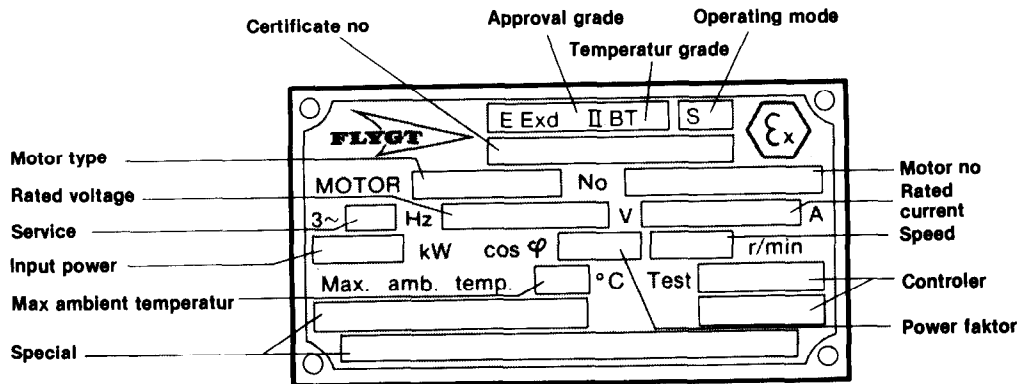
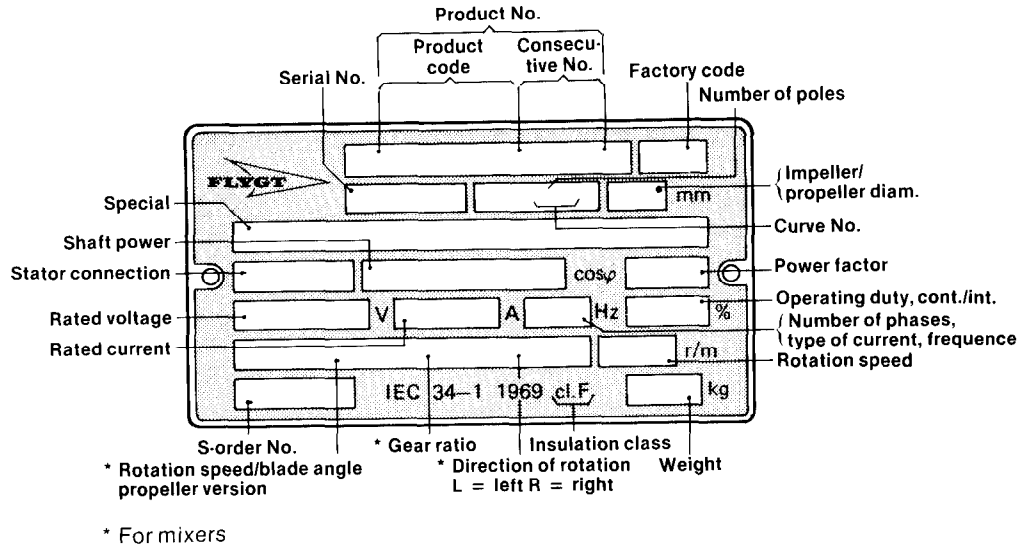


WORKSHOP MANUAL



DATA PLATE



How to use the workshop manual

This workshop manual describes how pump 2125 is taken apart and put together in connection with service and reconditioning work.

The manual begins with numbered photographs — and sometimes drawings — of different steps in the work. These steps are described on the fold-out pages at the back of the manual.

Information is also provided on special tools that not only facilitate the work but are sometimes necessary for a successful result.

We would also like to point out that the practical work of putting the manual together has been done under very favourable conditions. We have disassembled and assembled a factory-new pump and worked in a modern, well-equipped workshop.

NOTE for Ex version

All work on the explosion-proof version of the pump must be performed by authorized Flygt personnel.

Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.

Official approval applies only providing:

- that the product is used under conditions described in the care and maintenance instructions and in applications for which it is intended;
- that all service and repair work is done by a workshop authorized by Flygt;
- that genuine Flygt parts are used.

Safety precautions

- **Make sure that the lifting equipment is rated for the weight you are going to lift and is in good condition.**
- **Do the work on a stable work bench.**
- **Beware of the risk of electric shock.**
- **Make sure that tools and other equipment are in good condition.**
- **Keep a first-aid kit handy.**

Contents

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Technical data

For weights, amperages, voltages, power ratings and rpm, see the pump's data plate.

Tightening torque

Impeller nut 75 Nm (55 ft lb)

Winding resistances at 20°C (68°F)

Stator	Resistance Ohms/phase
283 22 28	0.341
283 22 30	1.06
283 22 32	0.406
283 22 34	0.493
283 22 37	0.282*
283 22 38	1.47
283 22 44	1.79
283 22 50	2.26
283 22 52	2.79
283 22 55	3.12
283 88 57	0.709

* Reconnectable, the resistance varies between series and parallel connection.

Lubricants

Part No	Description
90 17 51	Motor oil SAE 10W-30
90 17 52	Mobil Whiterex 309 for raw or clean water pumping
90 20 61	Bearing grease. Esso Unirex N3

Tools

Part No	Description	Use
398 21 00	Sleeve	Mechanical seal
398 26 00	Sleeve	Mechanical seal
398 27 00	Sleeve	Mechanical seal
394 69 00	Stator lifting tool	Stator
285 40 00	Adjusting sleeve	Impeller HT
339 45 00	Sleeve	Impeller nut HT
84 20 48	Puller	Impeller HT

Electrical connections

SUBCAB 4G/SUBCAB AWG*:

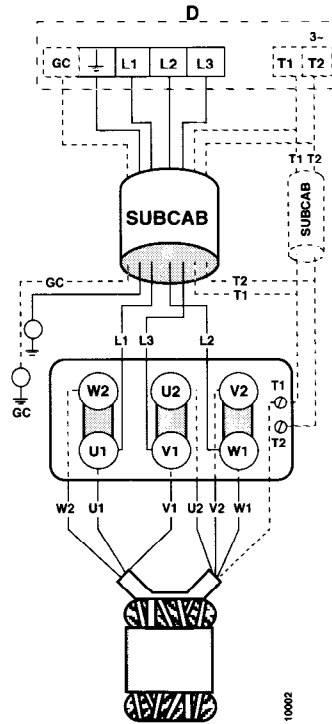
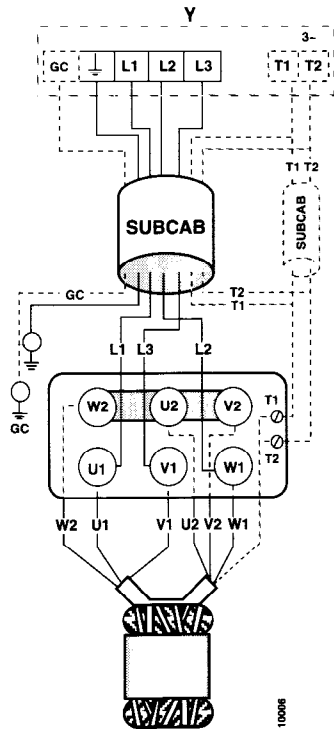
Mains	Lead	Pump terminal board
L1	Brown (Red*)	U1
L2	Blue (White*)	W1
L3	Black (Black*)	V1
Earth	Yellow/green	\perp
Groundcheck	Yellow*	GC
T1	Black/orange*	T1
T2	Black/blue*	T2

Connect the control leads from the motor control circuit to T1 and T2.

The stator leads are colour-marked as follows:

U1, red
V1, brown
W1, yellow
V2, blue
W2, black
U2, green

Check on the data plate which connection, Y or D, should be used for the power supply in question. Then arrange the closing links between the terminal screws for Y or D connection, see figure.



Electrical connections

SUBCAB 4G/SUBCAB AWG*:

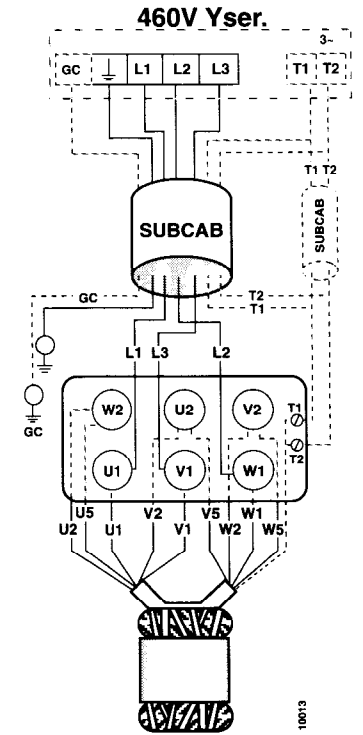
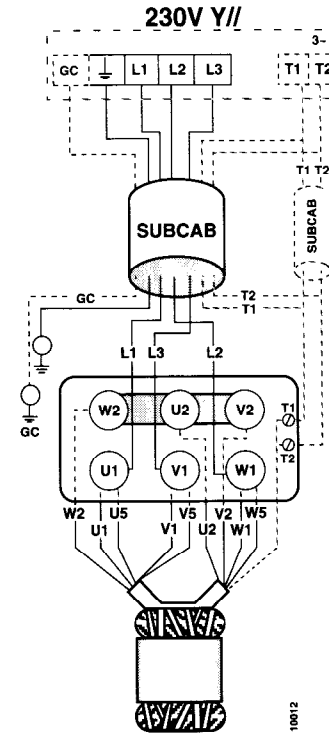
Mains	Lead	Pump terminal board
L1	Brown (Red*)	U1
L2	Blue (White*)	W1
L3	Black (Black*)	V1
Earth	Yellow/green	\perp
Groundcheck	Yellow*	GC
T1	Black/orange*	T1
T2	Black/blue*	T2

Connect the control leads from the motor control circuit to T1 and T2.

The stator leads are colour-marked as follows:

U1 (S1) — red
V1 (S2) — brown
W1 (S3) — yellow
U2 (S4) — green
V2 (S5) — blue
W2 (S6) — black
U5 (S7) — red
V5 (S8) — brown
W5 (S9) — yellow

Check on the data plate which connection, Y or D, should be used for the power supply in question. Then arrange the closing links between the terminal screws for Y or D connection, see figure.



Electrical connections

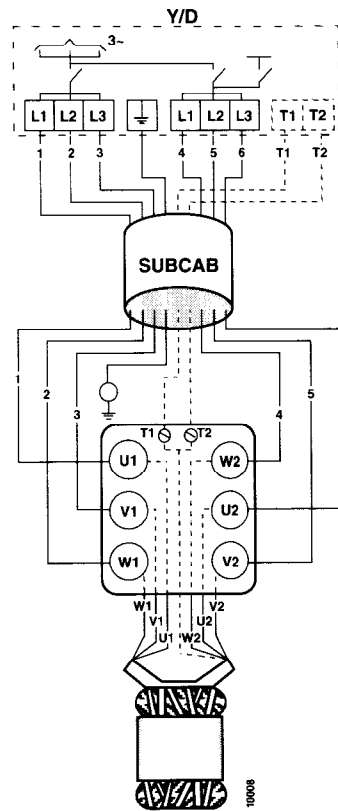
SUBCAB 7G

Mains	Lead	Pump terminal board
L1	Black 1	U1
L2	Black 2	W1
L3	Black 3	V1
L1	Black 4	W2
L2	Black 5	V2
L3	Black 6	U2
Earth	Yellow/green	⏏
T1	Black T1	T1
T2	Black T2	T2

The stator leads are colour-marked as follows:

U1 (S1)	— red
V1 (S2)	— brown
W1 (S3)	— yellow
U2 (S6)	— green
V2 (S4)	— blue
W2 (S5)	— black

Connect the control leads from the motor control circuit to T1 and T2.

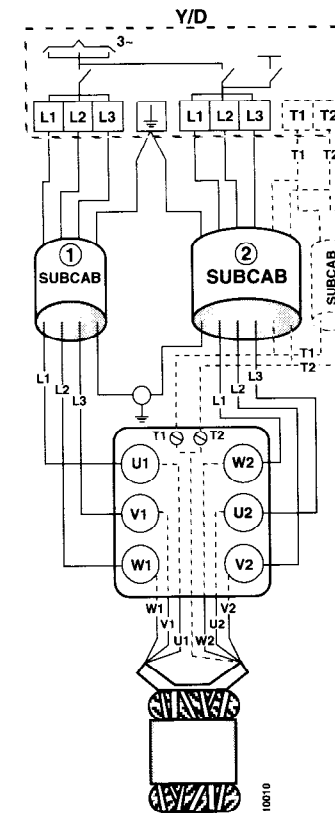


Electrical connections

SUBCAB 4G 1+2

Mains	Lead	Pump terminal board	The stator leads are colour-marked as follows:
L1	Brown	U1	U1 (S1) — red
L3	Blue	W1	V1 (S2) — brown
L2	Black	V1	W1 (S3) — yellow
L1	Brown	W2	U2 (S6) — green
L3	Blue	V2	V2 (S4) — blue
L2	Black	U2	W2 (S5) — black
Earth	Yellow/green	⏏	
T1	Black T1	T1	
T2	Black T2	T2	

Connect the control leads from the motor control circuit to T1 and T2.



Electrical connections with contactor unit

SUBCAB 4G/SUBCAB AWG*:

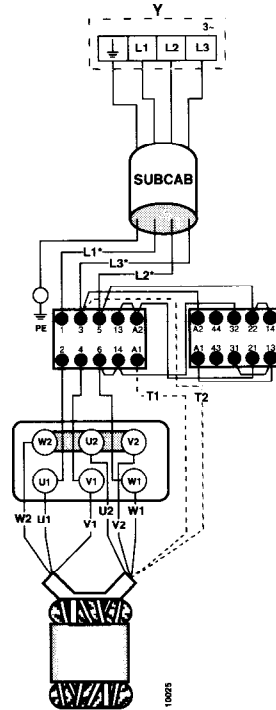
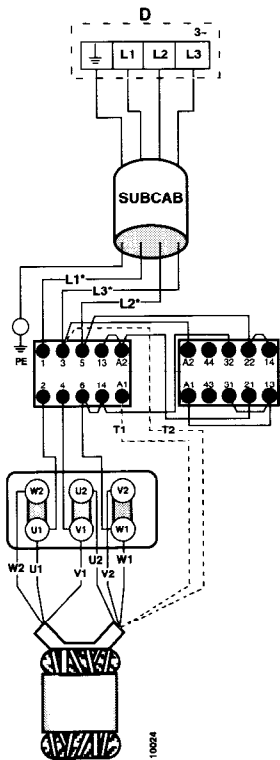
Mains	Lead	Pump terminal board
L1	Brown (Red*)	1
L3	Black (Black*)	3
L2	Blue (White*)	5
Earth (PE)	Yellow/green	⊥ PE
Groundcheck	Yellow*	GC

Connect the white control leads from the motor control circuit to A1 and 3.

The stator leads are colour-marked as follows:

U1 (S1)	— red
V1 (S2)	— brown
W1 (S3)	— yellow
U2 (S6)	— green
V2 (S4)	— blue
W2 (S5)	— black

Check on the data plate which connection, Y or D, should be used for the power supply in question. Then arrange the closing links between the terminal screws for Y or D connection, see figure.



Electrical connections with contactor unit

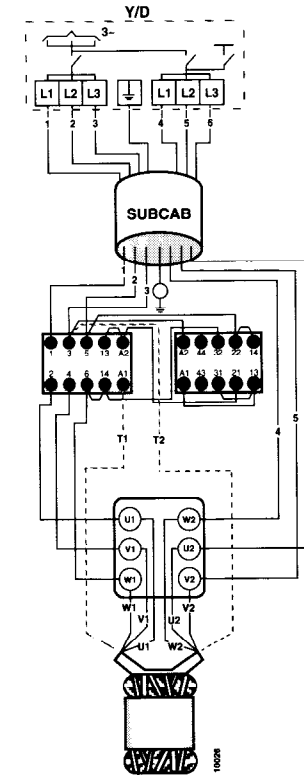
SUBCAB 7G

Mains	Lead	Contactor unit	Pump terminal board
L1	Black 1	1	
L2	Black 2	3	
L3	Black 3	5	
L1	Black 4		W2
L2	Black 5		V2
L3	Black 6		U2
Earth	Yellow/green		⊥

The stator leads are colour-marked as follows:

U1 (S1)	— red
V1 (S2)	— brown
W1 (S3)	— yellow
U2 (S6)	— green
V2 (S4)	— blue
W2 (S5)	— black

Connect the white control leads from the motor control circuit to A1 and 3.



Electrical connections with contactor unit

SUBCAB 4G 1+2

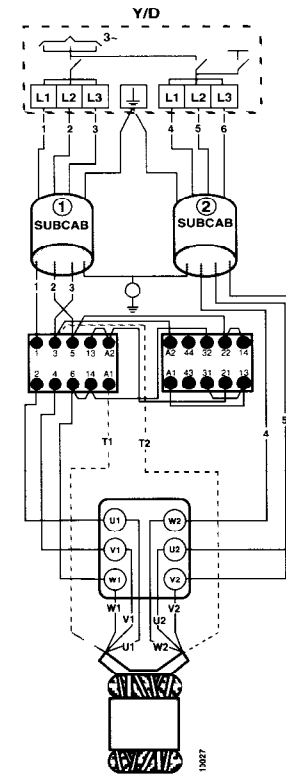
Mains	Lead	Pump terminal board
-------	------	---------------------

L1	Brown	1
L3	Black	3
L2	Blue	5
Earth	Yellow/green	PE

The stator leads are colour-marked as follows:

U1 (S1)	— red
V1 (S2)	— brown
W1 (S3)	— yellow
U2 (S6)	— green
V2 (S4)	— blue
W2 (S5)	— black

Connect the white control leads from the motor control circuit to A1 and 3.



13037

Ex version, 2125.050

Work on specially approved pumps should only be carried out by Flygt or workshops/personnel authorized by Flygt.

Pumps with special approval shall be handled with extra care.

On all Ex approved pumps, the gaps between different parts, for example between the stator casing and the junction box, shall prevent any sparks from the interior from getting out and igniting surrounding gases.

All joint widths and gaps shall be measured with accurate and well-calibrated instruments. All joint surfaces shall be inspected. There should be no scratches, tool marks or such like on the flame paths.

Failure to meet the above requirements will render the special approval invalid. Note that all work on Ex approved equipment requires experienced and trained personnel.

Disassembly

The parts for which dimensions are to be checked are noted in the parts list. It is very important that the joint surfaces on these parts are not damaged during disassembly, or on reassembly.

Assembly

Measure gaps and joint widths.

Inspect that joint surfaces and lightly smear them with grease to prevent corrosion.

If a part does not meet the requirements on dimensional accuracy or surface finish, it must be discarded and a new specially approved part procured. The new part must also be inspected.

Take good care during assembly so that the joint surfaces are not damaged.

Joint	Joint width mm (in)	Diameter mm (in)	Gap	
			min mm (in)	max mm (in)
I	26,5 (1.043)	38 (1.496)	0,146 (0.0057)	0,345 (0.0136)
II	22 (0.866)	200 (7.784)	0,050 (0.0020)	0,194 (0.0076)
III	—	194 (7.638)	Shrink fit	—
IV	—	$\begin{matrix} 0 & 0 \\ 103,1-0,1 & (4.059-0.004) \\ 104 \pm & (4.094-0.001) \end{matrix}$	0,87 (0.0343)	1,03 (0.0406)
V	26 (1.024)	200 (7.784)	0,050 (0.0020)	0,194 (0.0076)
VI	32 (1.260)	200 (7.784)	0,050 (0.0020)	0,194 (0.0076)

Electrical connections

In order to prevent flashover (arcing) and sparking when the motor cable is connected to the terminal board, it is important to observe the following:

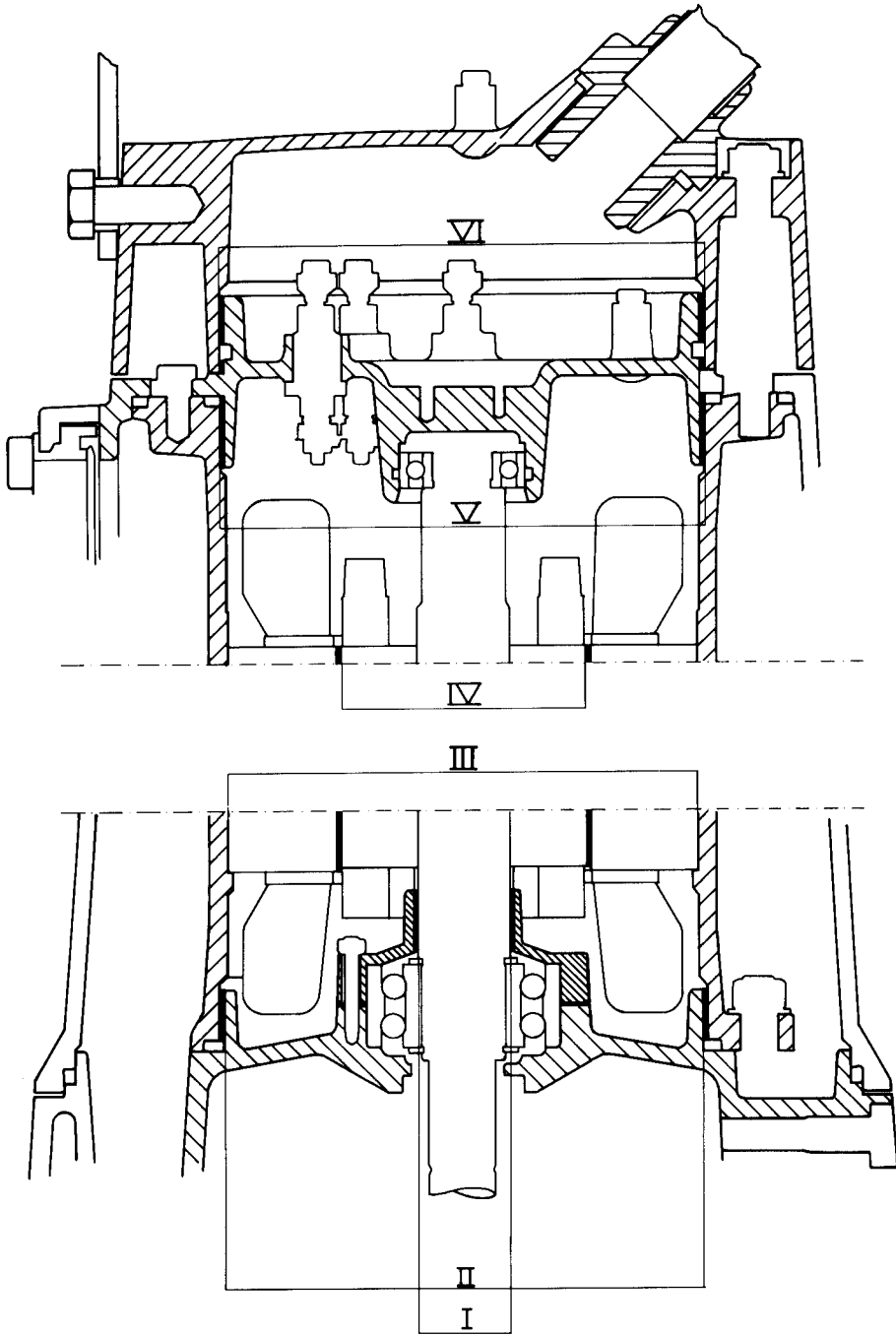
Make sure that the insulation on the conductor is complete, from the cable entry to the terminal.

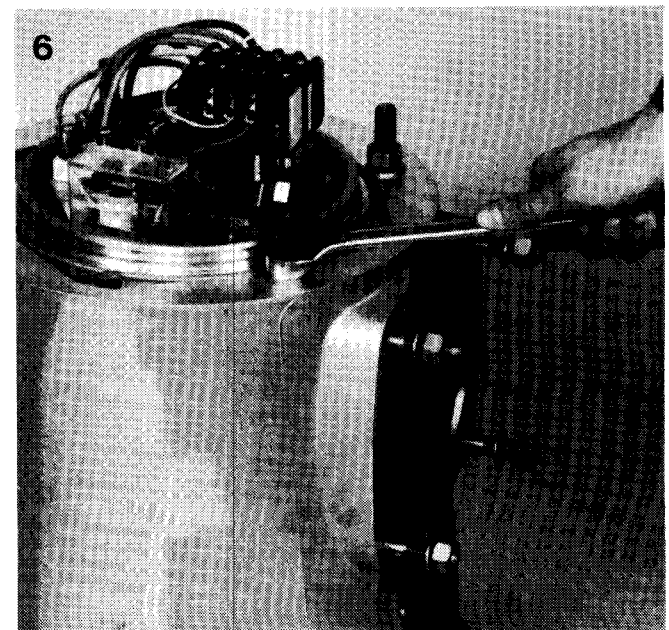
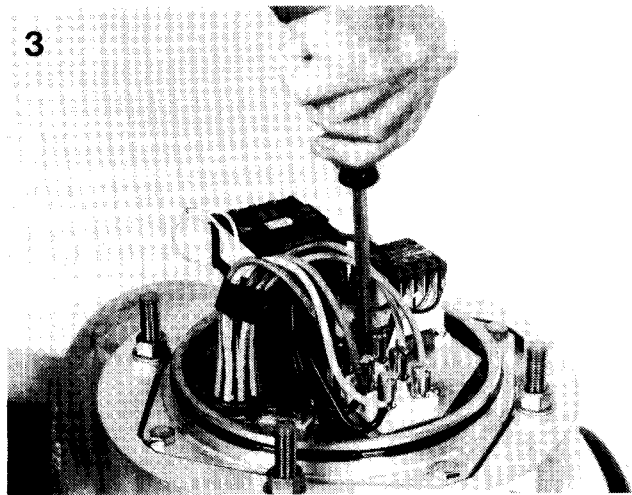
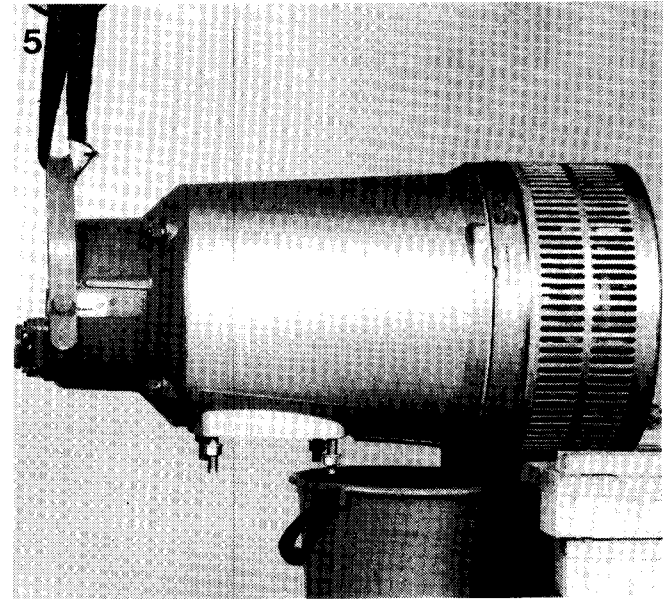
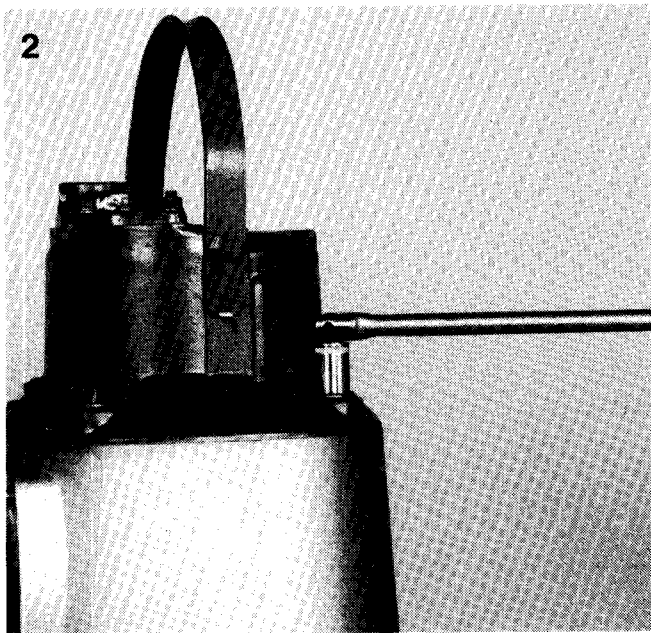
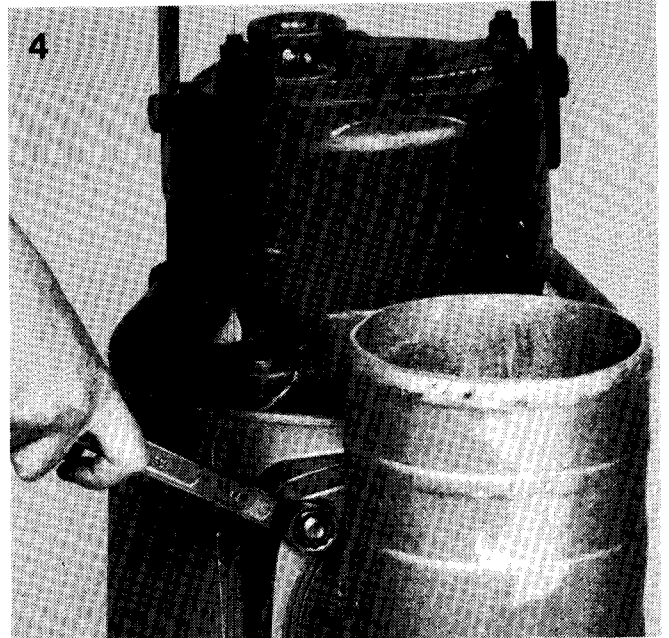
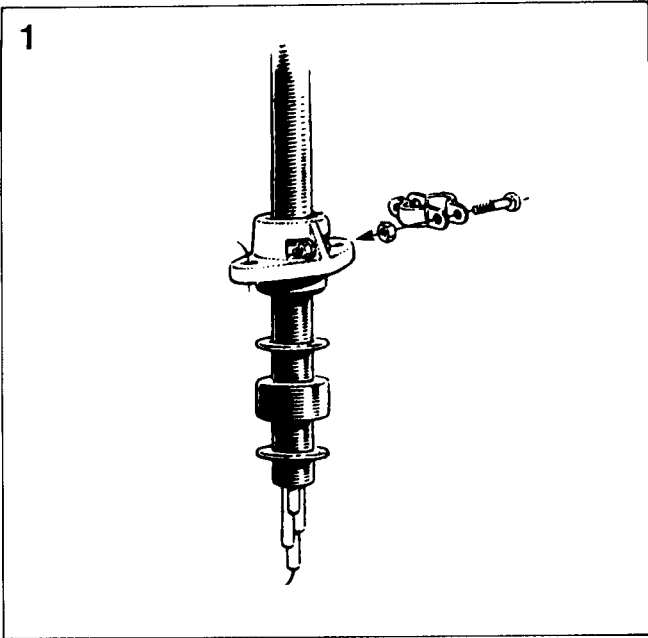
Make sure that the bare copper wires on the conductor termination are not too long, and that there are no bare strands.

This also applies to start and control conductors.

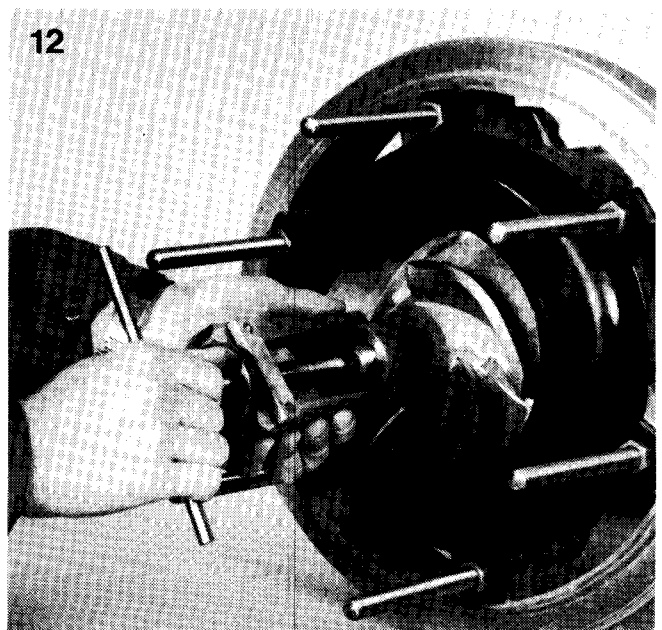
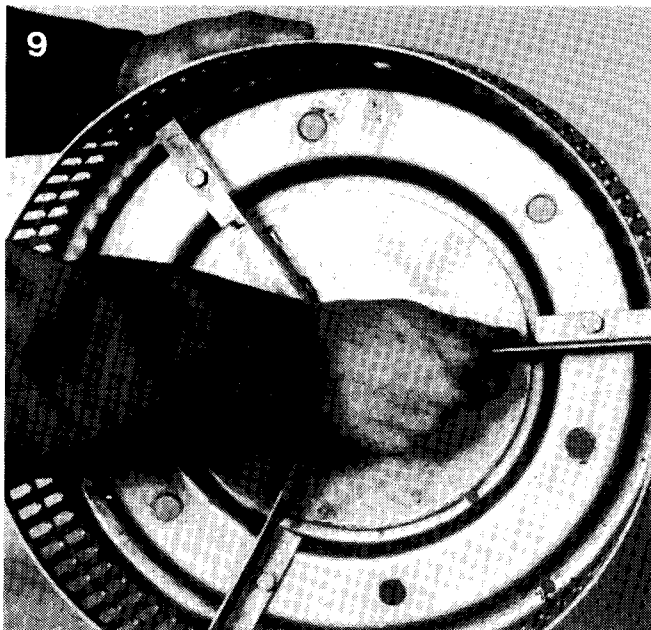
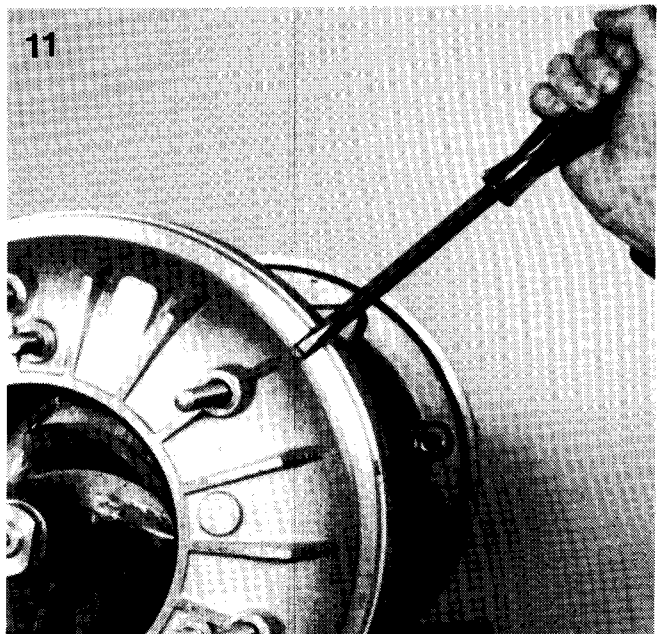
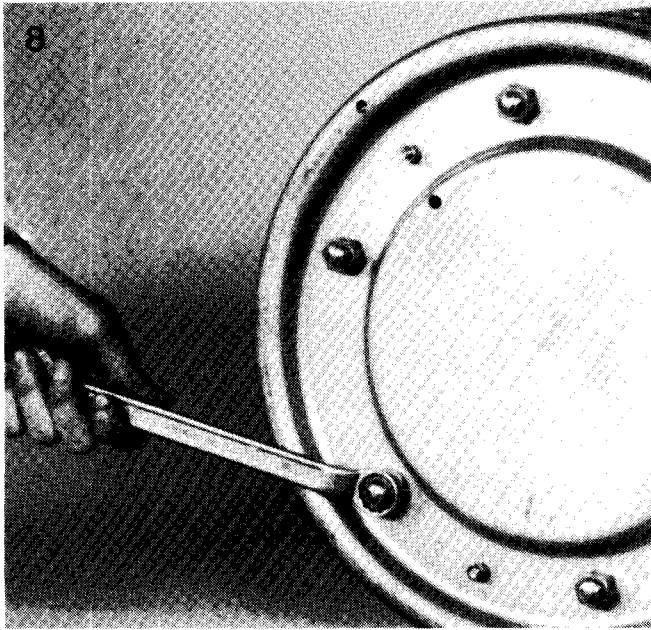
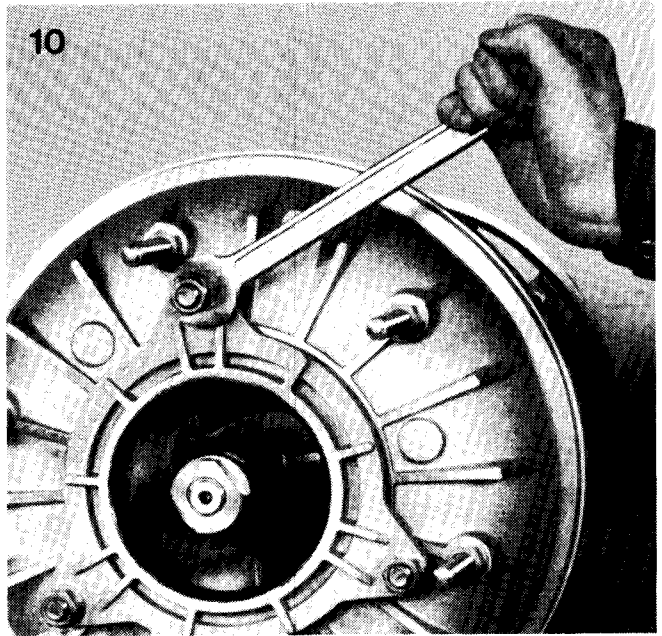
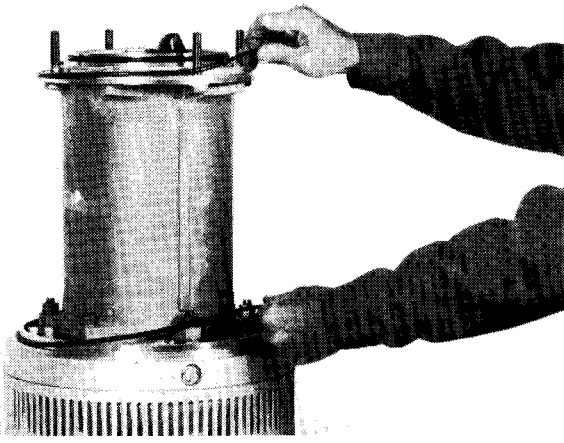
When the pump is assembled, check the insulation resistance of the stator.

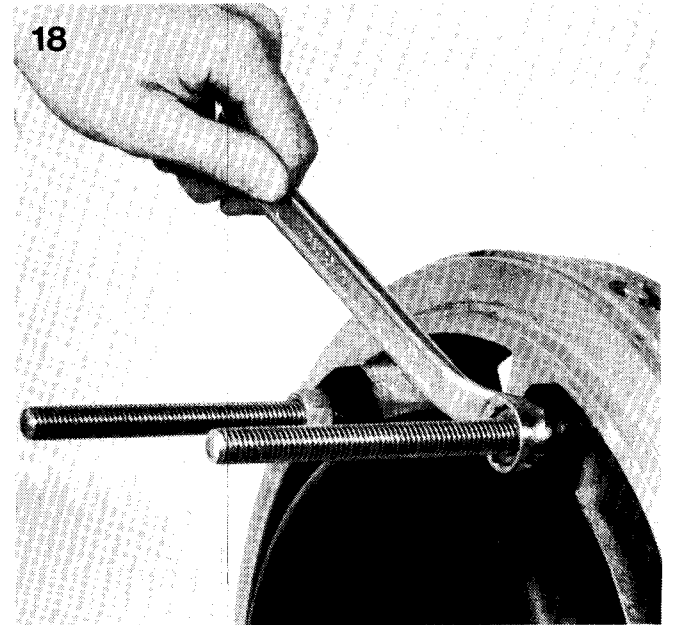
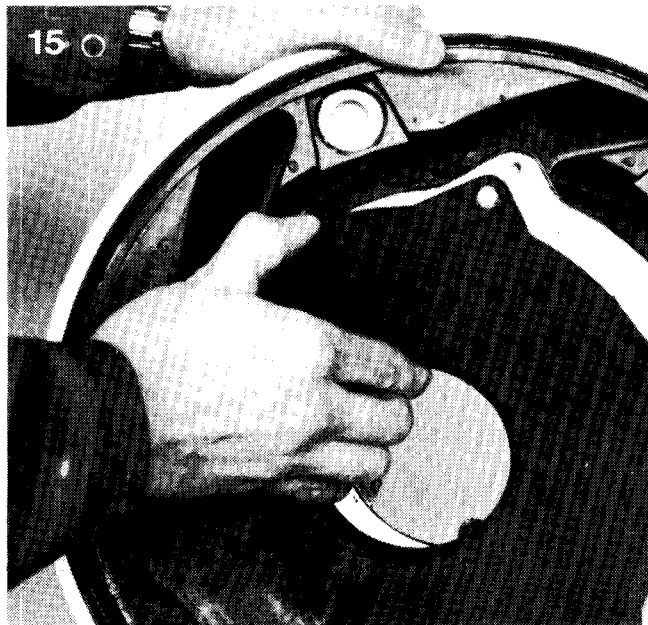
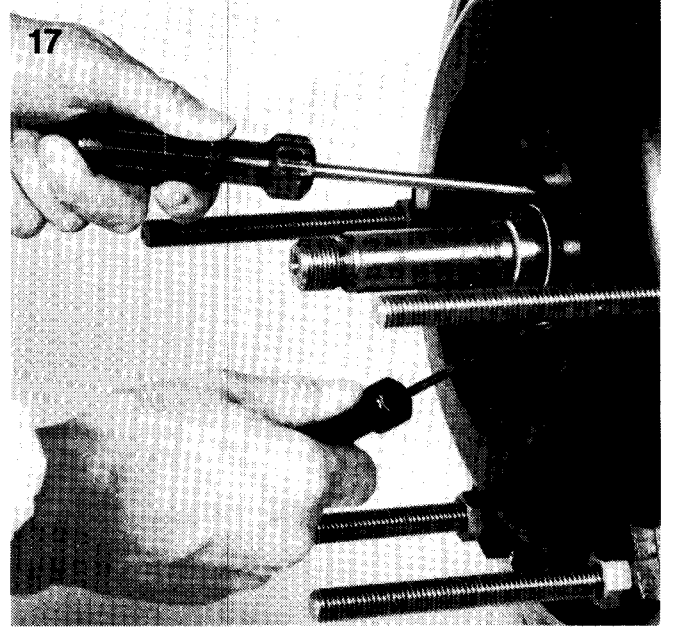
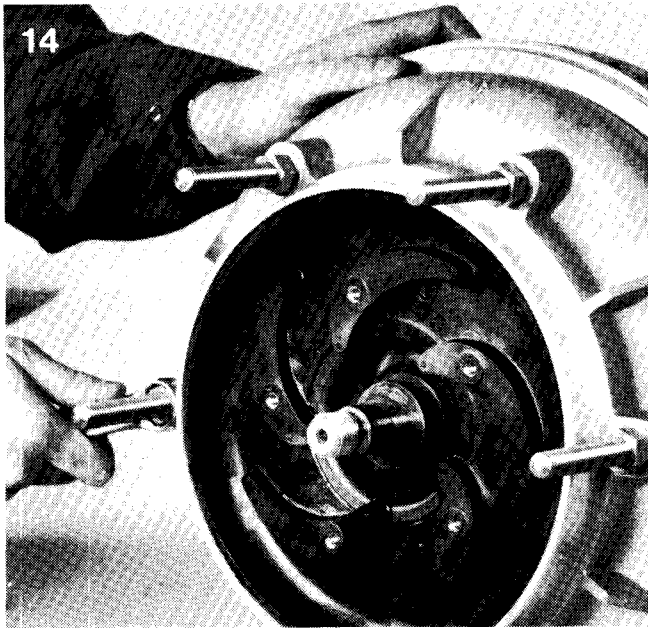
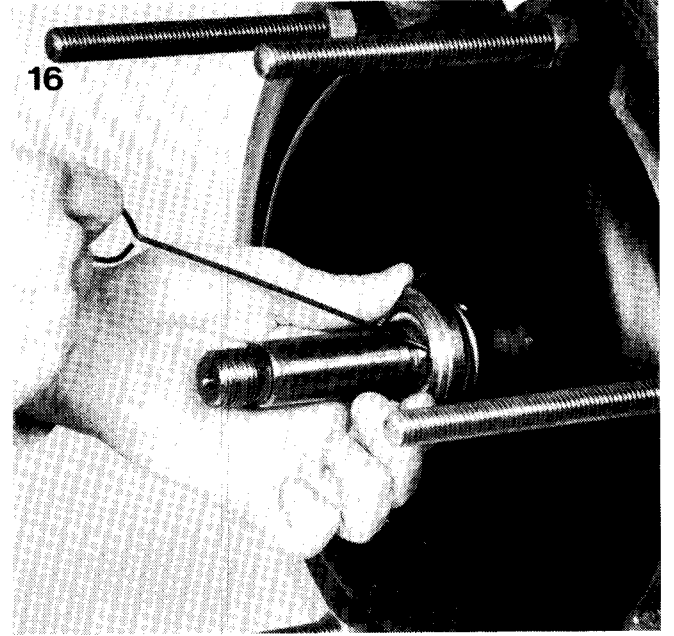
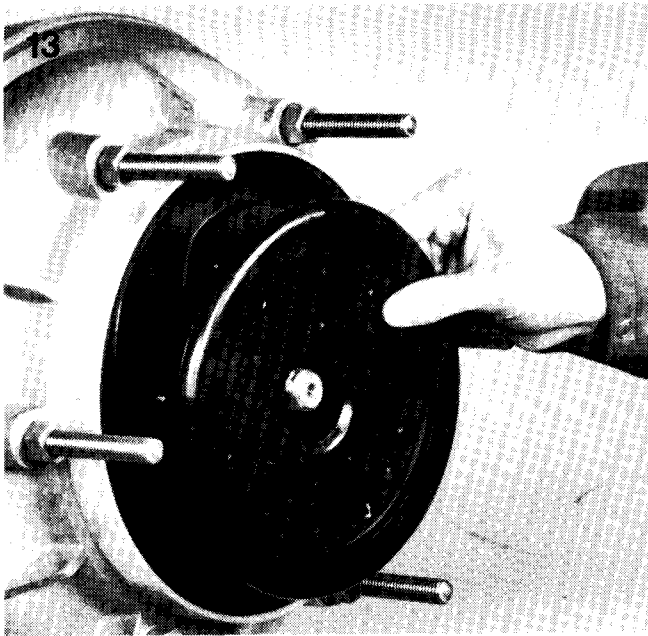
Use an insulation tester rated at 1000V, the insulation between the phases and between any phase and earth shall be at least $> 1M\Omega$.

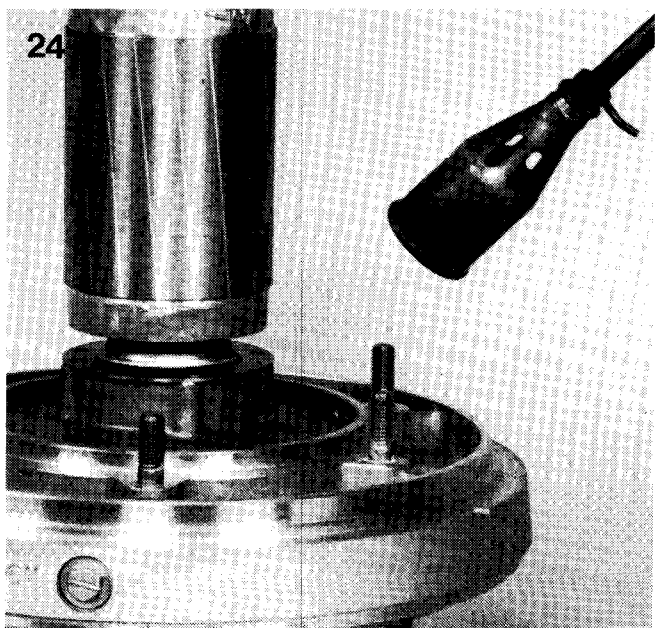
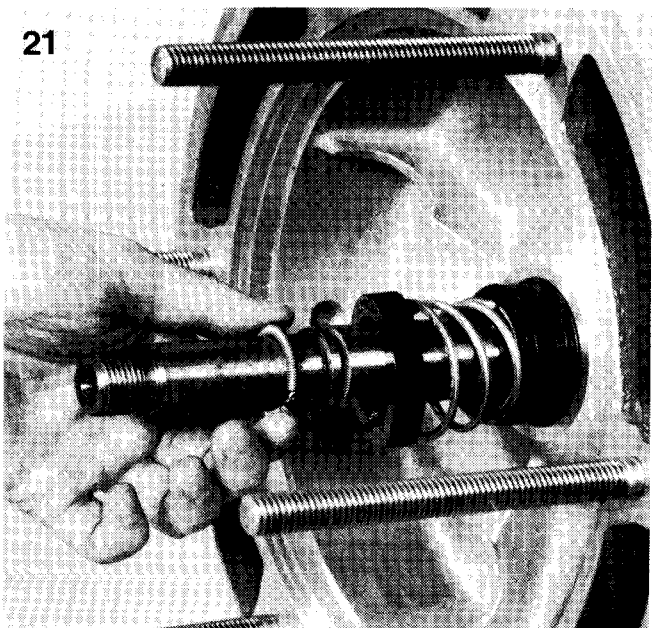
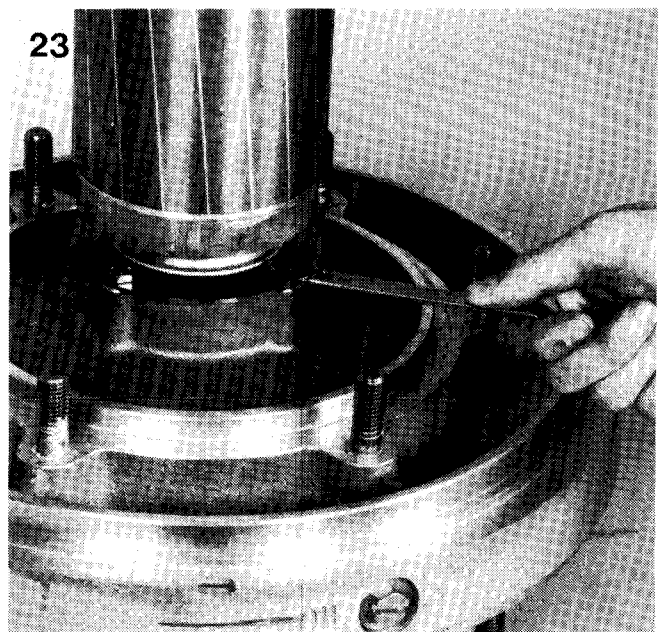
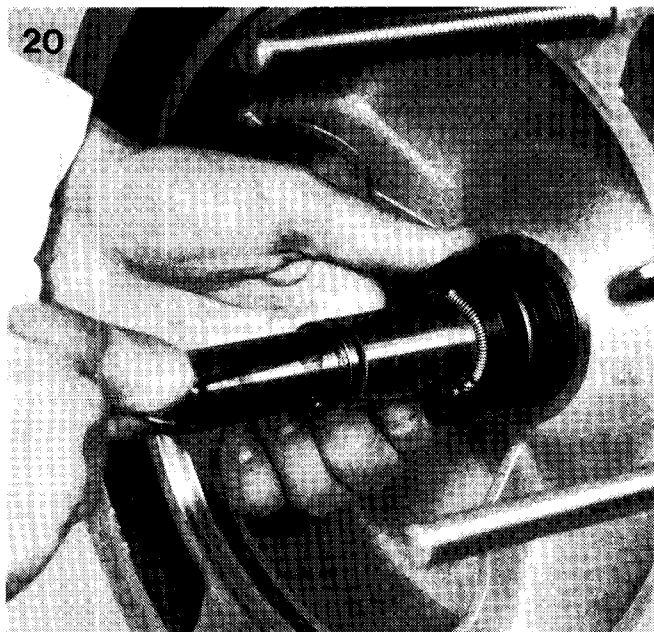
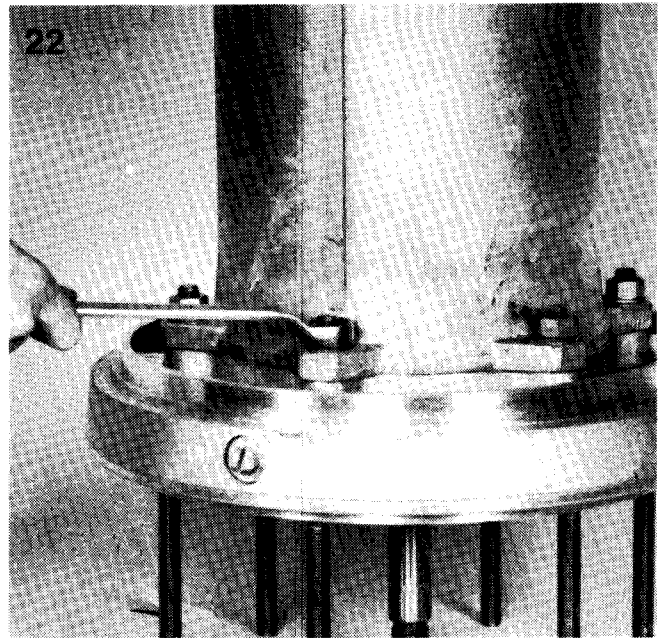
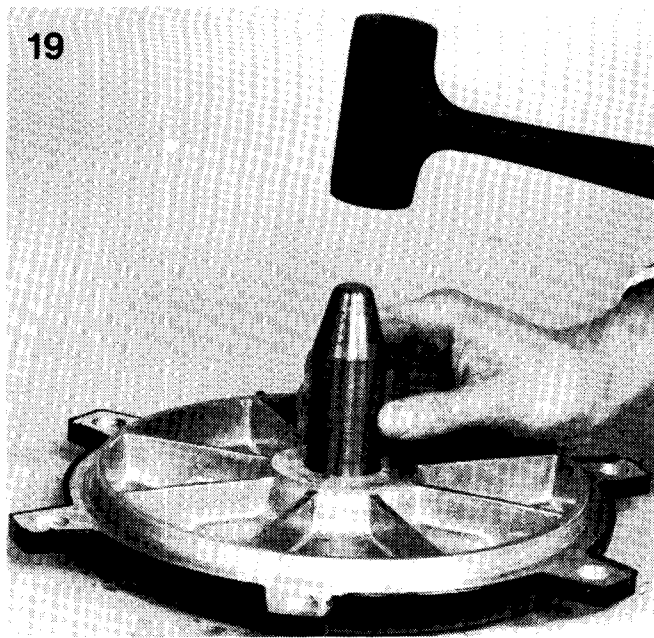


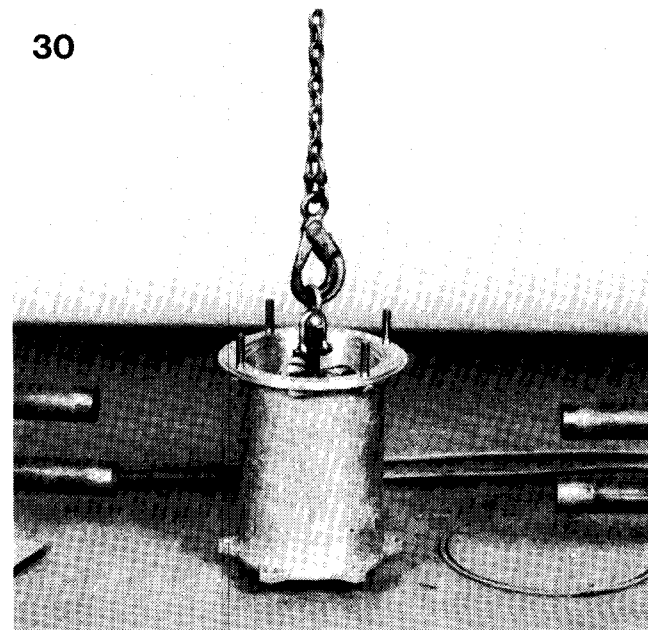
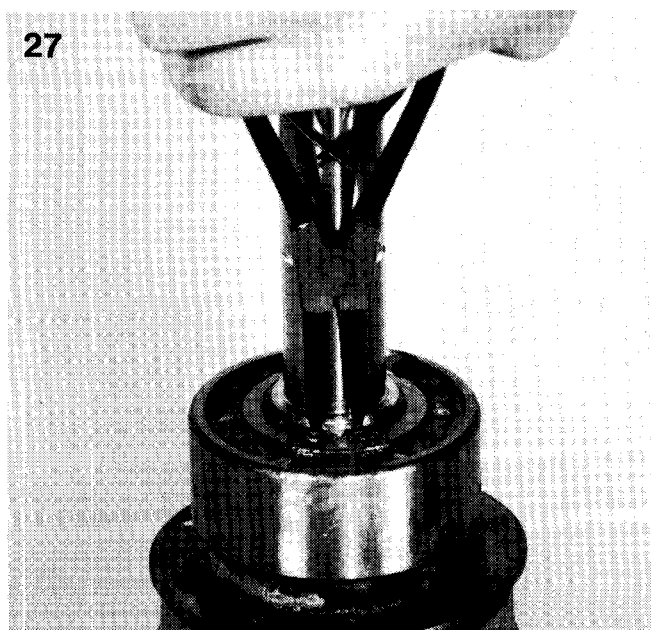
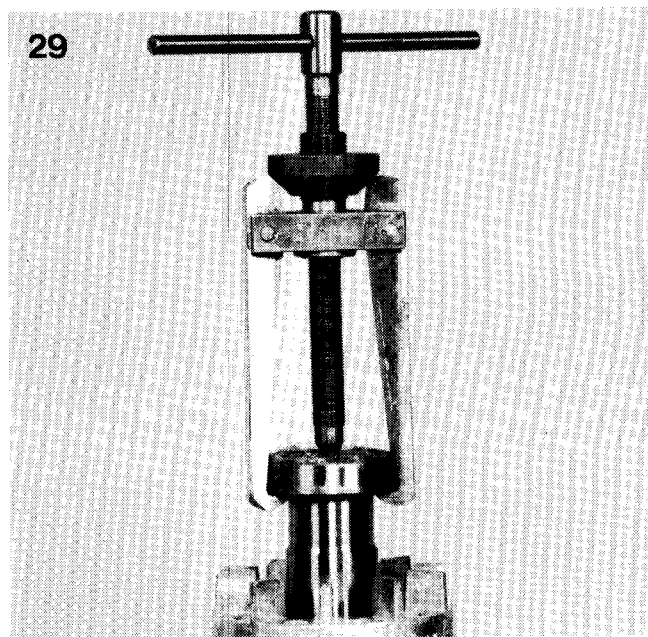
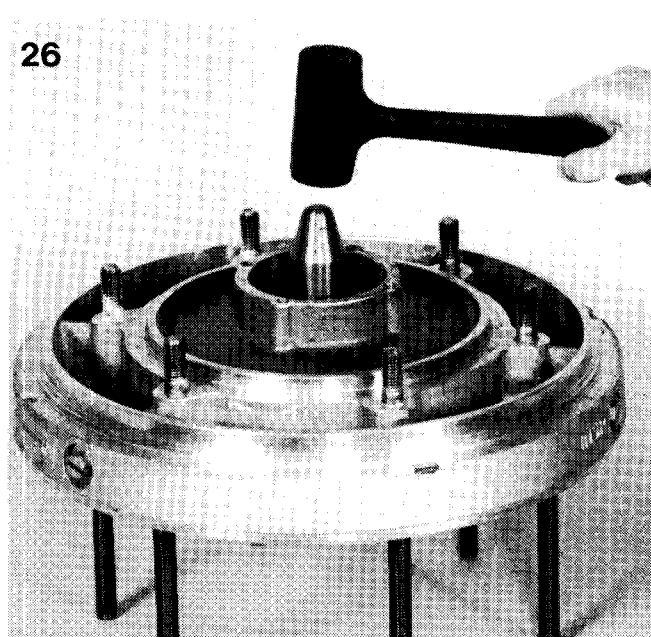
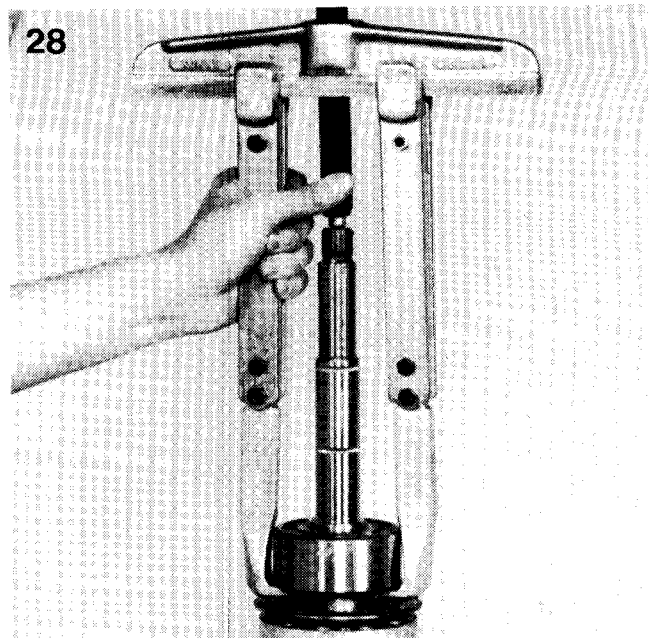
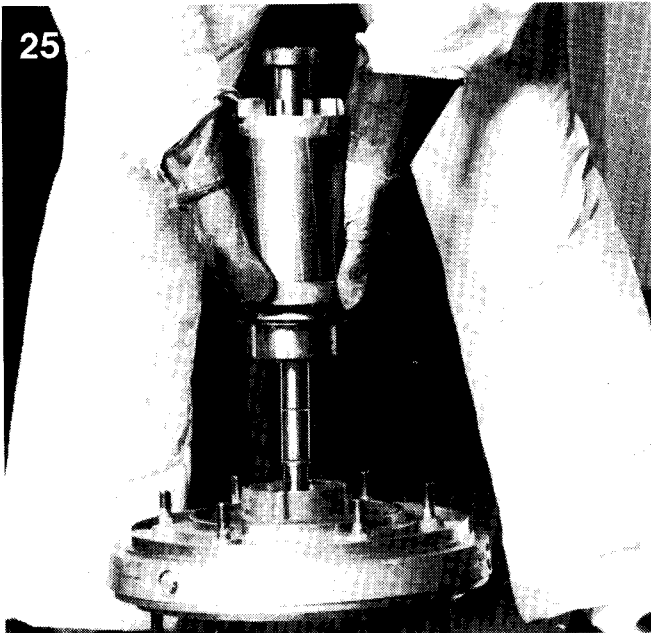


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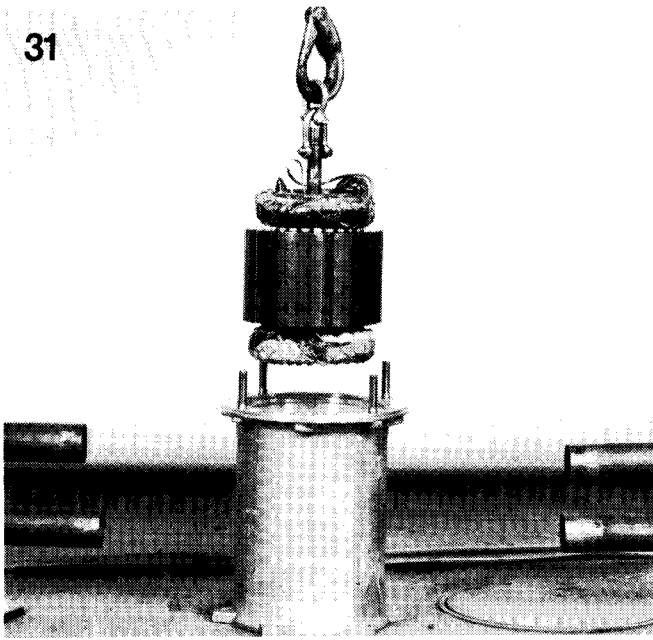




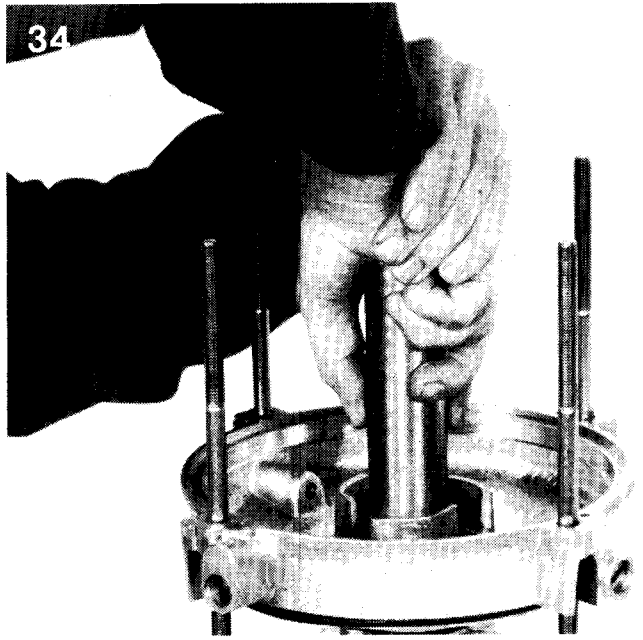




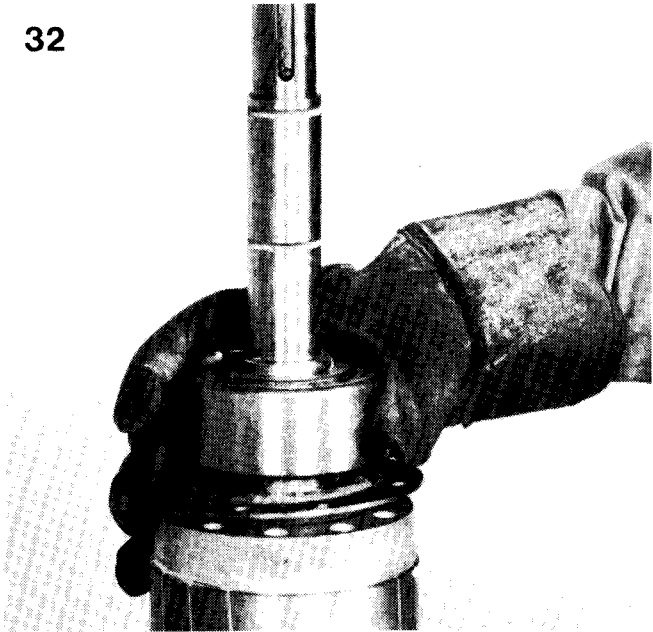
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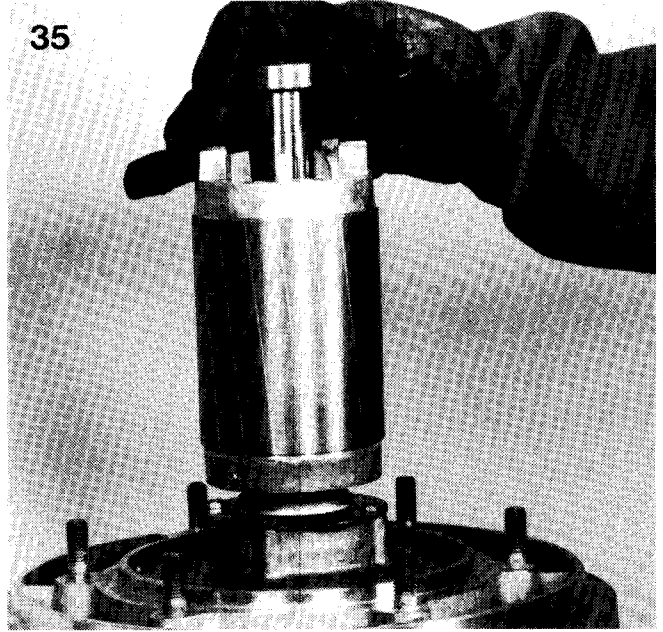
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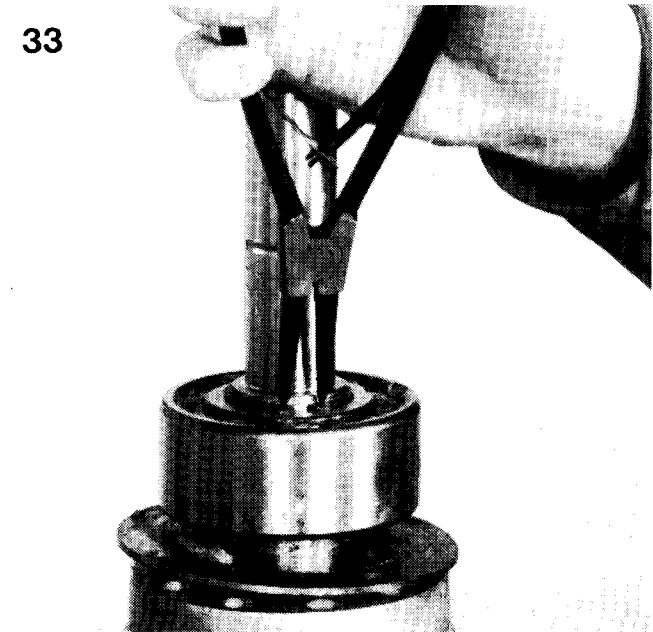
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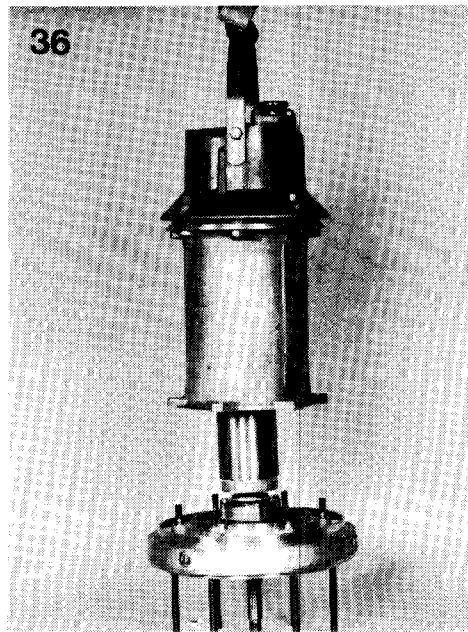
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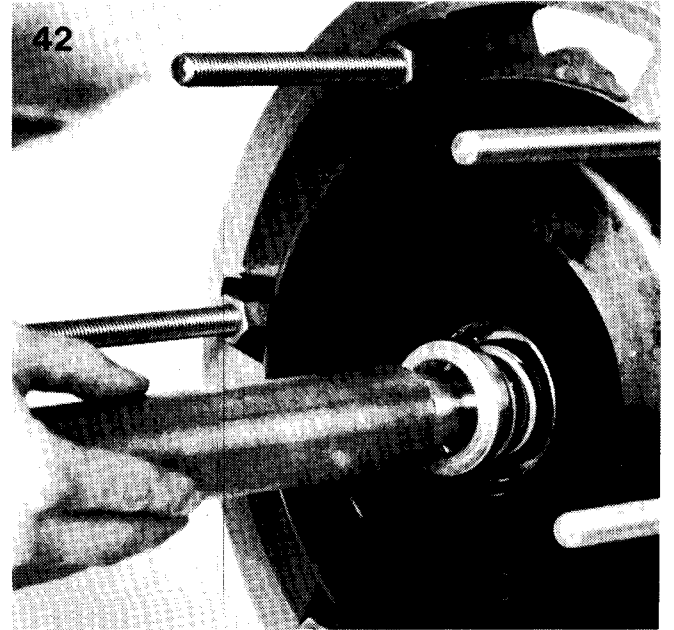
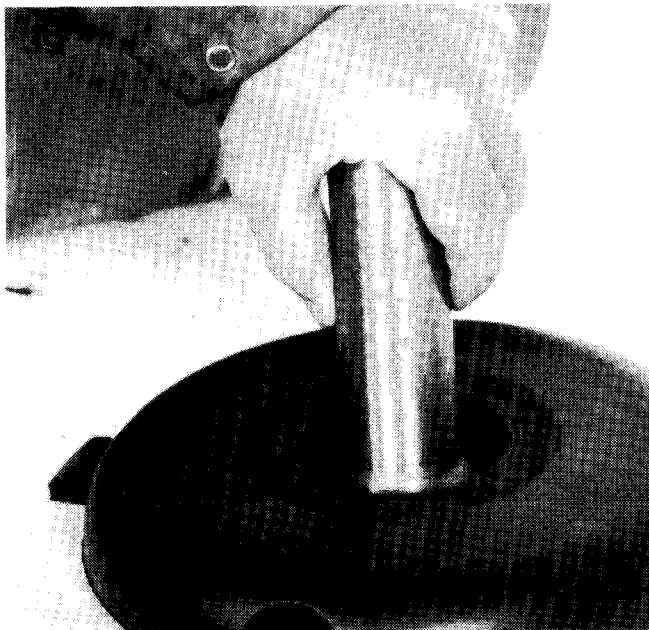
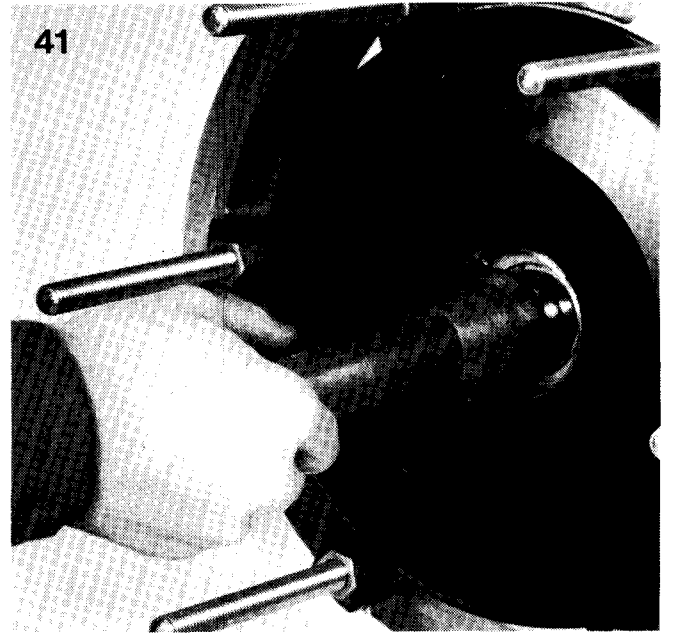
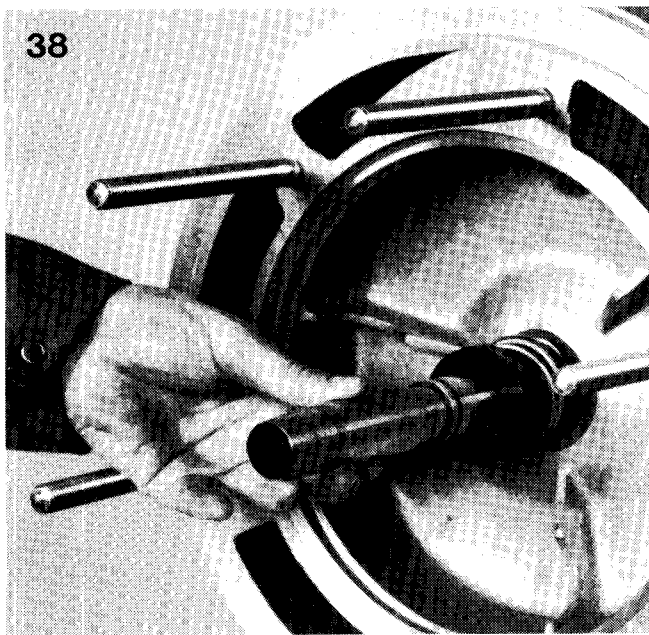
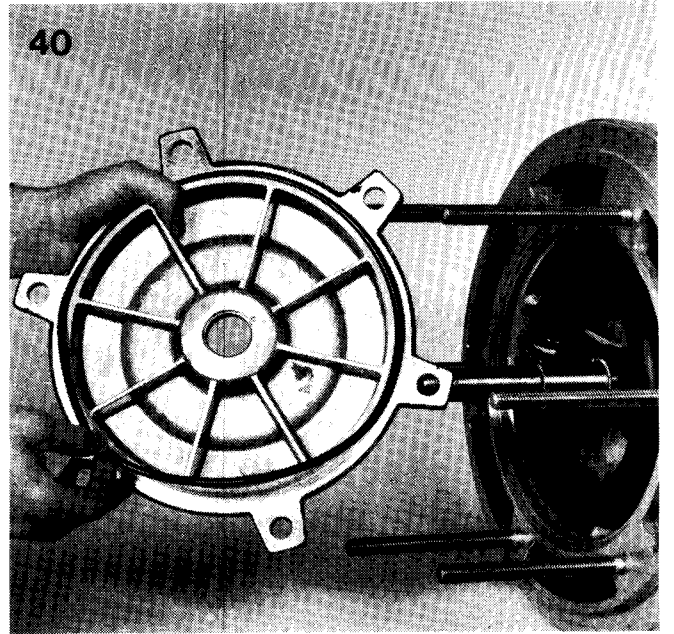
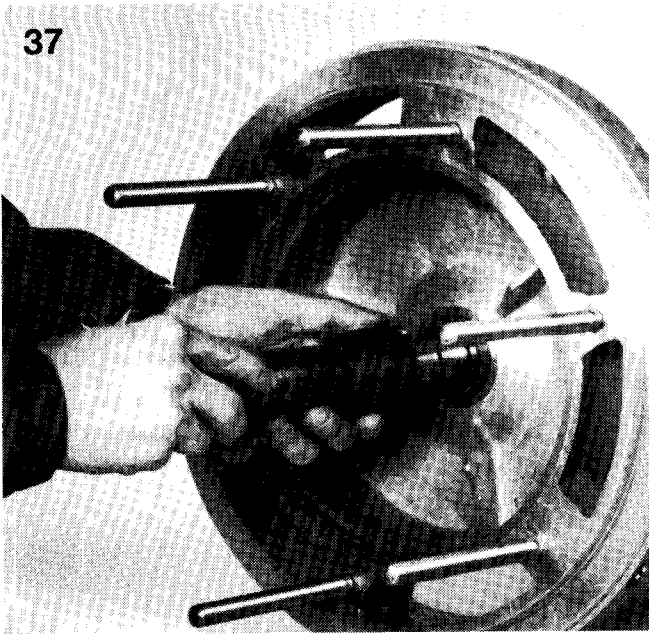


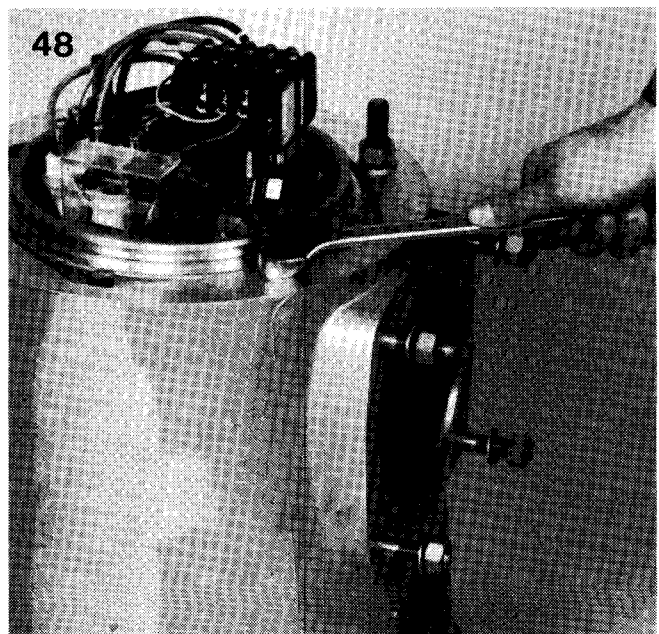
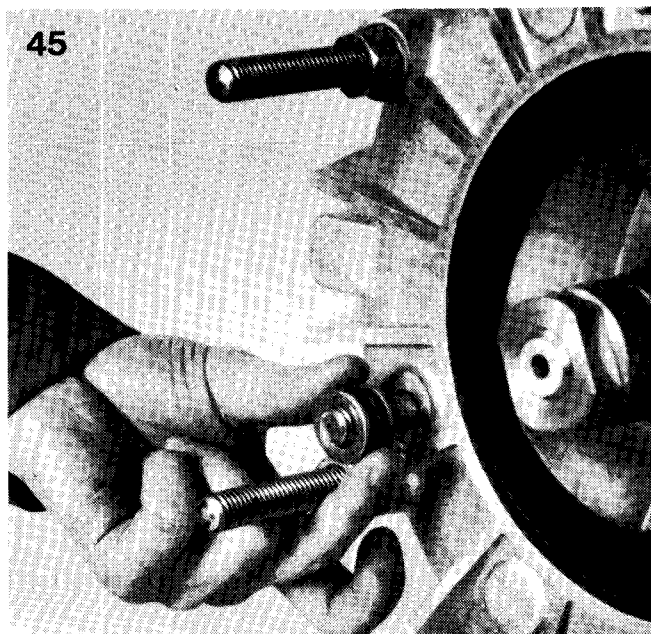
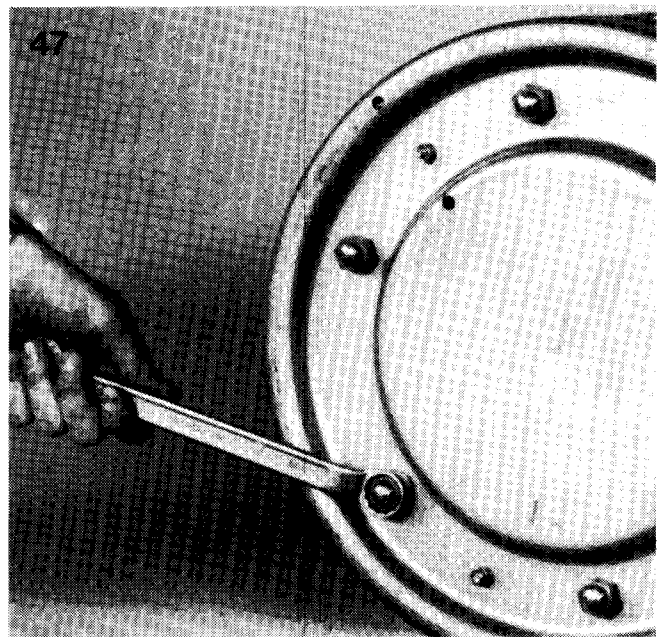
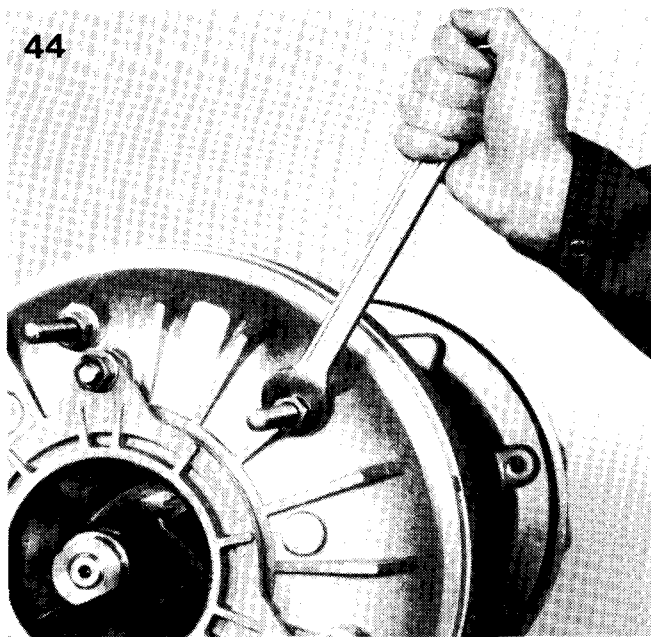
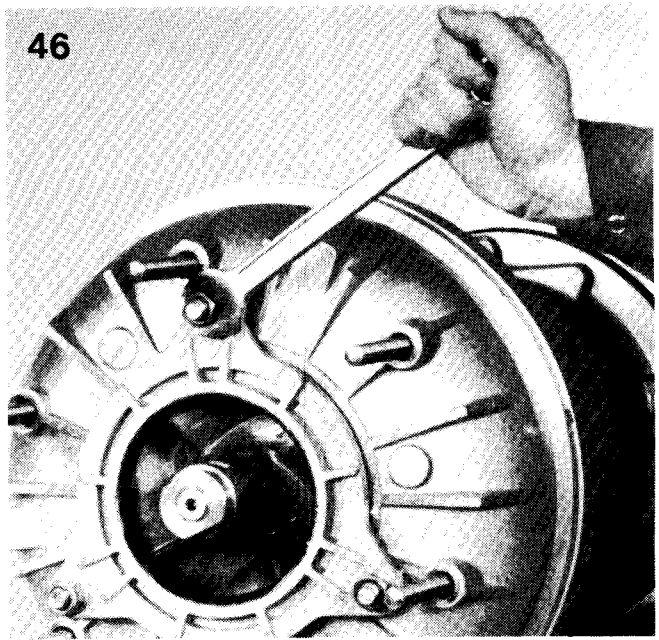
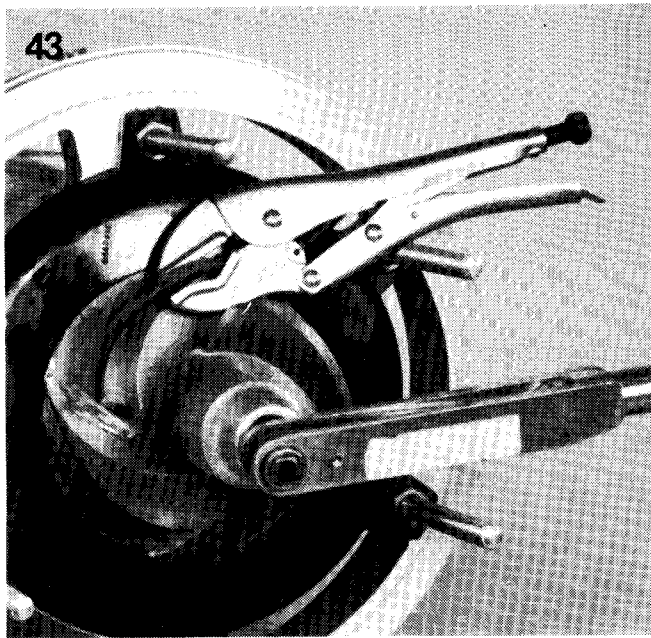
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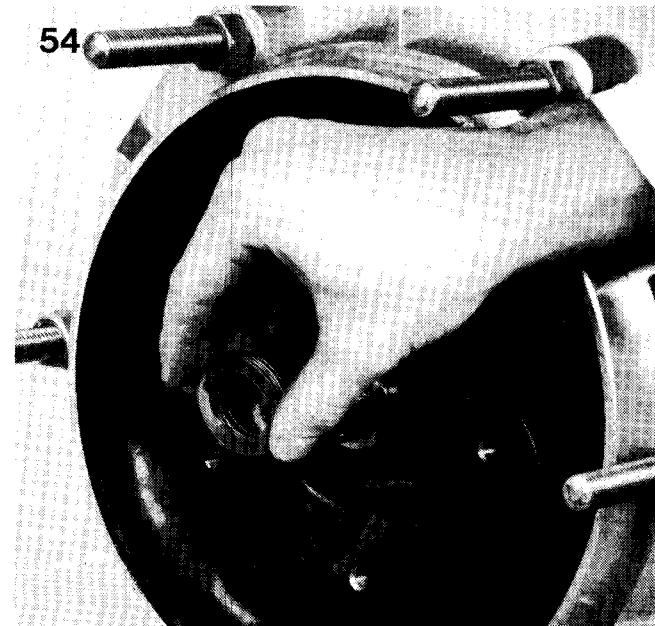
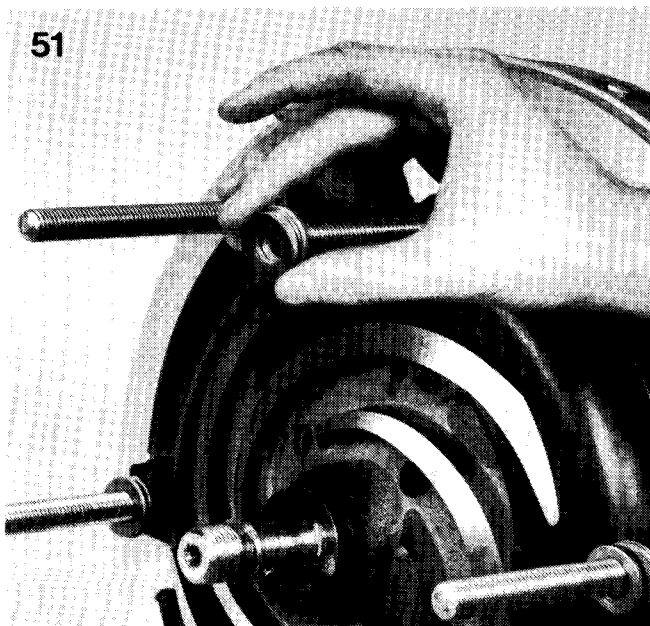
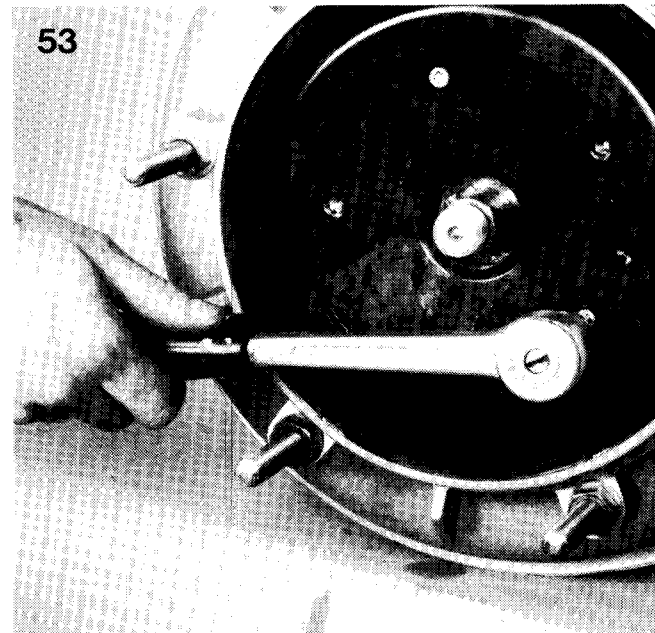
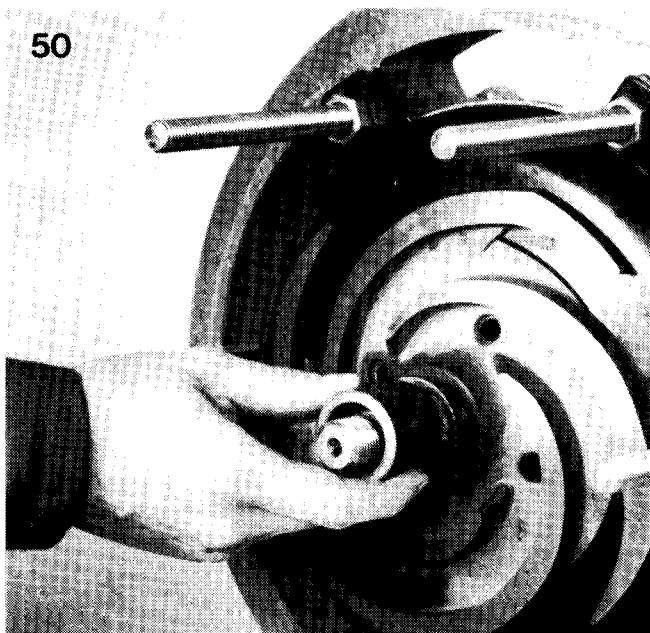
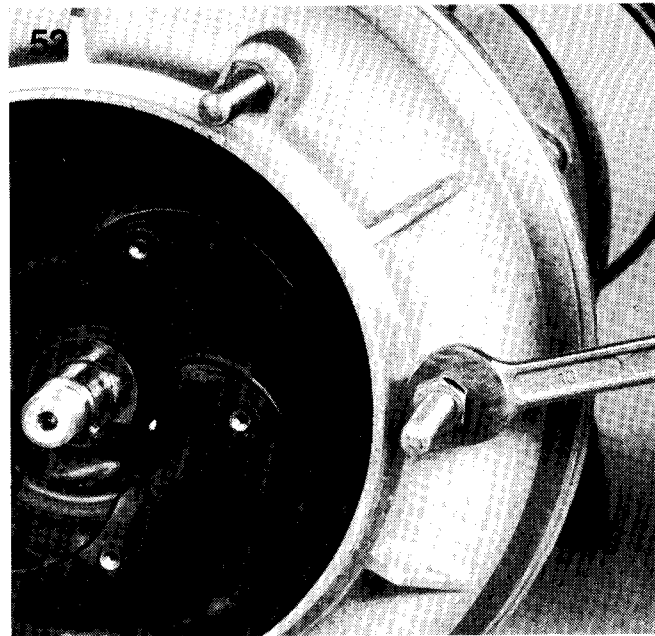
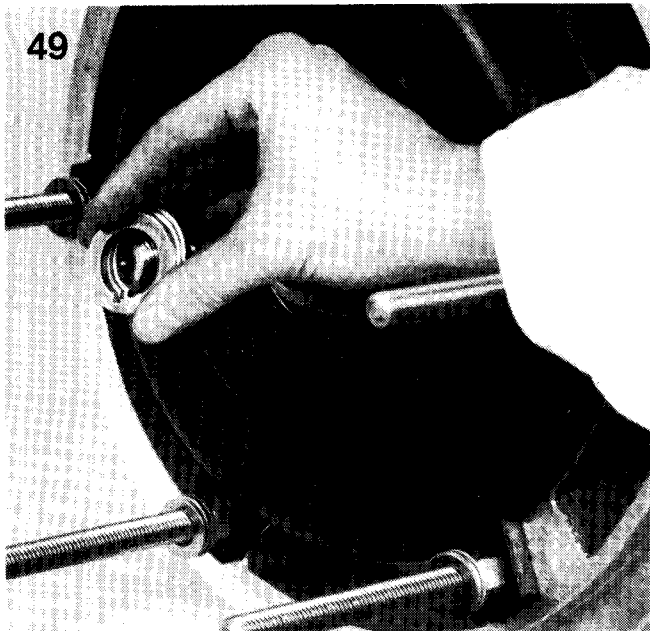


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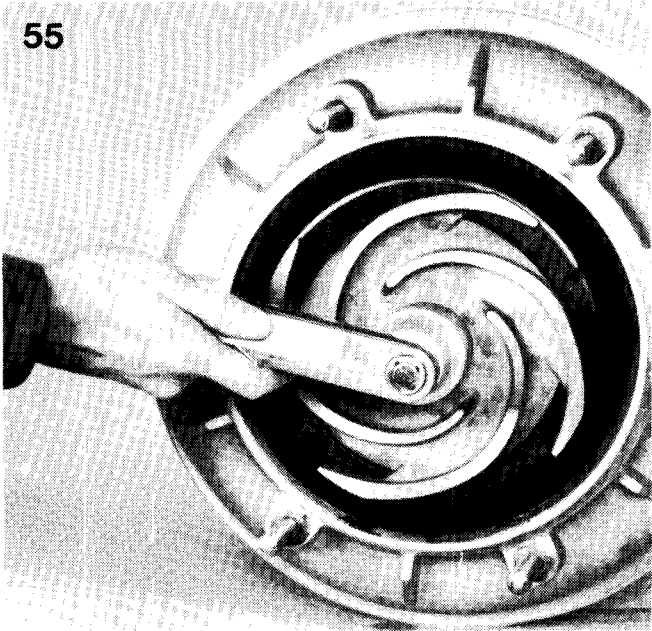




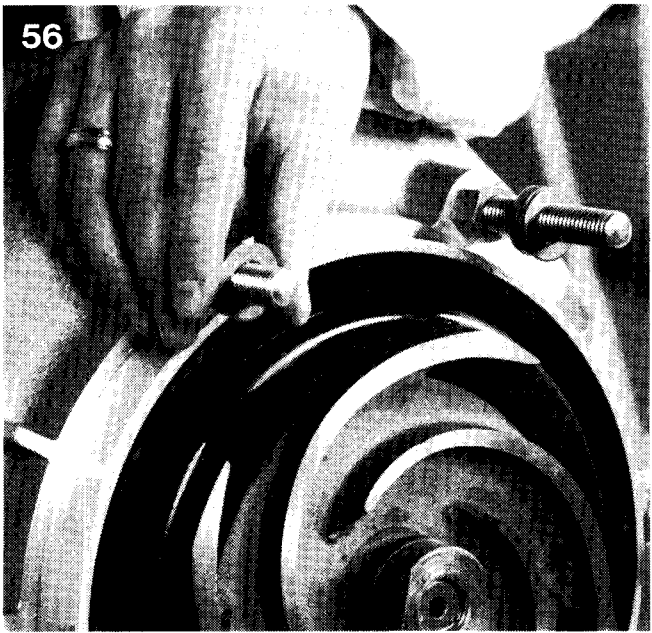




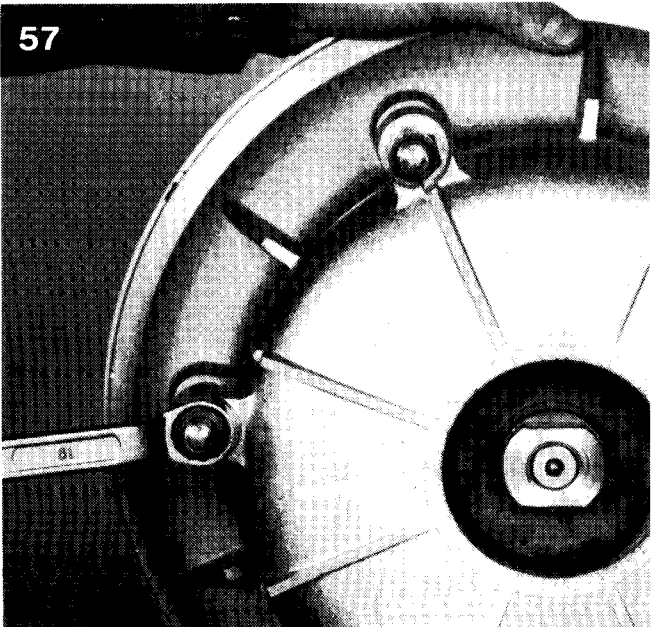
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General rules

Wash the outside of the pump thoroughly and blow dry.

Clean all parts thoroughly — especially the O-ring seats — prior to assembly.

Always replace all O-rings, other seals and — in connection with bearing replacement — any lock washers and round nuts.

Oil moving parts, O-rings and threads — do not touch sealing surfaces.

DISASSEMBLY

Cable entry unit

Place the pump on a work bench.

- 1 Undo the clamp screws.
Remove the screws on the cable entry flange (17 mm).
- 2 Remove the screws on the junction box cover (19 mm) and remove the cover.
Remove the O-ring.
Remove the screws on the earthing plate and pull out the earth cable.
Remove all leads.
- 3 Undo the slotted screws and remove the plate with contractor and terminal board.

Discharge connection

- 4 Undo the nuts (19 mm) and remove the discharge connection and seal ring.

Draining the oil

- 5 Slacken the filler and drain screws (19 mm) slightly without allowing oil to escape.
Lay the pump on the bench so that the drain plug is free for oil drainage.
Remove the filler screw. **WARNING!** If the seal is leaky, the oil casing may be under pressure — hold a rag or the like over the oil screw to prevent oil spatter.
Place a vessel under the pump (the oil casing holds about 1.4 l).
Remove the drain screw and allow oil to run out.
Screw back the drain screw securely.
Screw back the filler screw lightly.

Cooling jacket

- 6 Unscrew the nuts (19 mm) and lift off the cooling jacket.
- 7 Remove the O-rings on the stator casing and the oil casing.

Strainer

Lay the pump down on the bench.

- 8 Remove the nuts (19 mm) on the strainer and take off the strainer.
Take off the sleeves (not on HT version).
- 9 Remove — if necessary — the rotation preventer (10 mm) (not on HT version).

Lower diffuser

- 10 Remove the three nuts (19 mm) with washers and pull out the lower diffuser (HT version: six nuts)

Diffuser ring

- 11 Remove the six nuts (19 mm) and prize off the diffuser (not on HT version).

Impeller MT (HT outer impeller)

- 12 Remove the impeller nut.
Remove the impeller with puller 84 20 48.
Do **not** prize off the impeller, since it can easily be damaged.
Remove the shaft key and the adjusting washers.

HT version (inner impeller)

- 13 Remove the diffuser disc (five socket hex screws $\frac{1}{4}$ ").
14 Remove the six nuts (19 mm) on the diffuser ring and pull it out.
15 Remove the six socket hex screws ($\frac{1}{4}$ ") and remove the upper diffuser disc.
Pull off the impeller (puller 84 20 48).
Remove the gasket.

Seal, lower

- 16 Press in the stop ring so that the tension spring joint is accessible.
Insert and hook the spring puller in the tension spring and carefully pull out the spring.
Remove the stop ring, the compression spring and the clamping sleeve.
17 Remove the rotating seal ring. Be careful not to touch the sealing surface.

Oil casing bottom

- Place a vessel under the oil casing (a small amount of oil always remains in the oil casing).
18 Remove the nuts (19 mm) and prize off the bottom with a screwdriver. Note the O-ring and the pressure equalizer.
19 Carefully tap out the stationary seal ring (tool 398 32 00).

Seal, upper

- Press in the stop ring so that the tension spring joint is accessible.
Insert and hook the spring puller in the tension spring and pull out the spring.
20 Remove the stop ring, the compression spring and the clamping sleeve.
21 Remove the rotating seal ring. Be careful not to touch the sealing surface.

Bearing housing

- 22 Remove the nuts (19 mm) on the bearing housing and lift off the stator casing. Keep track of the O-ring.
23 Remove the four screws (10 mm) for the bearing cover.
24, 25 Carefully heat the bearing housing — pull up the rotor.
26 Carefully tap out the stationary seal ring (tool 398 32 00).

Rotor

- 27 Remove the circlip.
28 Pull off the main bearing.
Remove the inner washer.
Remove the cover.
29 Pull off the thrust bearing.

Stator casing

- Stand the stator casing on the floor with the stator facing upwards.
Connect tool 394 69 00 to the stator.
Raise the stator casing a couple of cm (about an inch) off the floor.
30 Position LP-gas burners around the stator casing. Light and turn on full. When the right temperature has been reached (about $150^{\circ}\text{C} = 332^{\circ}\text{F}$), the casing will fall onto the floor.
31 Lift away the stator and allow the units to cool.

ASSEMBLY

Stator casing

Stand the stator casing on the floor with the stator part facing upwards.

Put the stator in place in the casing. Be careful to match the key with the ways.

Heat the stator casing to 150°C, until the stator falls into the casing onto its seat.

Rotor

Fit the bearing cover. Be careful to position the washer correctly.

Place the washer against the shaft shoulder.

32 Heat the main bearing and lower it onto the washer.

33 Fit the circlip.

Bearing housing

34 Press the stationary seal ring into the bearing housing using tool 398 27 00.

Insert the rotor shaft into the bearing housing and heat carefully until the bearing is positioned correctly in its seat.

Screw down the bearing cover.

35 Heat the thrust bearing and place it on the end of the shaft.

Stator casing

36 Fit the stator casing (nuts 19 mm).

Seal, inner

Place the assembly sleeve 398 26 00 on the shaft.

37 Press in the rotating seal ring with tool 398 21 00, oil the sealing surface.

Fit clamping sleeve, spring and stop ring.

38 Roll the tension spring onto the shaft and press the spring into the shaft groove with tool 398 21 00.

Oil casing bottom, MT

39 Press in the stationary seal ring with tool 398 27 00.

40 Put in the pressure equalizer. Put the O-ring in place in the oil casing bottom and press the bottom into place. Screw in place with the six nuts (19 mm).

Seal, outer

41 Oil and press in the rotating seal ring with tool 398 21 00.

Fit clamping sleeve, spring and stop ring.

42 Roll the tension spring onto the shaft and press the spring into the shaft groove with tool 398 21 00.

Impeller, MT (HT: inner impeller)

Fit the shaft key.

Put on the adjusting washers.

Oil the end of the shaft and put on the impeller.

43 Tighten the impeller and check that there is as little clearance as possible between the impeller and the oil casing bottom. Use shims if necessary.

Tighten the hub nut, 75 Nm (55 lb ft).

Diffuser ring, MT

44 Fit the diffuser ring and tighten the nuts (19 mm).

HT: Fit guide vane and diffuser ring. Then follow instructions 49—57 before fitting the strainer etc.

Lower diffuser, MT

45, 46 Screw on the lower diffuser (19 mm), using shims if necessary.

Strainer

Put the sleeve (MT version) on each stud.

Press on the strainer (with the rotation preventer in place).

47 Tighten the nuts (19 mm).

Cooling jacket

Fit the O-ring on the stator casing.

Press the cooling jacket down into place.

48 Tighten with the nuts (19 mm).

Fit the hose connection. Don't forget the seal ring.

Filling with oil

Lay the pump down and brace it with the oil filler screw up.

Remove the oil filler screw.

Fill with 1.4 l of SAE 10W-30 motor oil.

Screw back the filler screw.

Impeller, HT

49 Make sure the end of the shaft is clean and free of burr. Polish off any flaws.

Check that the key is fitted and that there are a suitable number of adjusting washers on the shaft.

Oil the end of the shaft.

Place the impeller on the shaft.

50 Place the adjusting sleeve (285 40 00) on the shaft. Screw on the impeller nut and tighten it securely.

Make sure there is as little clearance as possible between the impeller and the oil casing bottom when the impeller is tightened. This can be adjusted with adjusting washers.

Check that the impeller can be rotated by hand.

51 Put adjusting washers on the studs to obtain minimum clearance between the impeller and the diffuser ring that is to be fitted. Make sure that the same type and number of washers is used on all studs.

52 Tighten the diffuser ring.

Check that the impeller can be rotated by hand when the nuts on the diffuser ring are tightened.

Unscrew the impeller nut and remove the adjusting sleeve.

53 Tighten the diffuser disc with the locking screws.

54 Place adjusting washers on the shaft between the impellers.

55 Put on the impeller and make sure that as little clearance as possible is obtained between the diffuser disc and the impeller when the impeller nut is tightened. This can be adjusted with the adjusting washers on the shaft.

Use sleeve 339 45 00 and tighten the impeller nut.

Tightening torque: 75 Nm (55 ft lb).

Check that the impeller can be rotated by hand.

56 Put adjusting washers on the studs so that minimum clearance is obtained between the impeller and the lower diffuser to be fitted. Make sure that the same type and number of washers is used on all studs.

57 Tighten the lower diffuser and check that the shaft can be rotated by hand.